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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/798,822	03/11/2004	David Cyganski	WP9-001	5042

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EXAMINER	
SULLIVAN, CALEEN O	

ART UNIT	PAPER NUMBER
1756	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/798,822	CYGANSKI ET AL.	
	Examiner	Art Unit	
	Caleen O. Sullivan	1756	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/12/2004; 10/05/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-3, 5-9, 11-14, 16-17, 19-20, 22-25, 27-31 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over McGinniss ('377) in view of Bae ('114).

McGinniss ('377) discloses a photopolymerizable vehicle and method for selective photo polymerization of the vehicle by application of a plurality of different selected wavelengths of energy where the single wavelength is inadequate for effecting photo polymerization. (See, abstract) The method disclosed in McGinniss ('377) consists of sequentially applying a plurality of different selected wavelengths of energy to the vehicle where photo polymerization is effected at the intersection of said wavelengths of energy. (See, abstract). The photopolymerizable vehicle is comprised of a monomer or oligomer, a photosensitive donor, and a photo initiating acceptor. (See, abstract). The wavelengths are preferably generated by lasers. (See, abstract).

McGinniss ('377) discloses that donor molecules are activated to excited states, and then transfer that energy to an acceptor molecule that bears photo-initiating reactivity. (See, col.3, 18-28). Without the exposure at the second wavelength the excited states of the donor molecules will not result in any energy transfer. (See, col.3, 30-34). McGinniss ('377) further discloses that a series of donor molecules can be excited one after the other prior to the generation of an acceptor molecule in an excited state; therefore the use of three or more wavelengths of energy can also be used. (See, col.3, 40-44). This disclosure meets the limitation of claim 16, where a third exposure with a third wavelength is performed.

McGinniss ('377) discloses that the donor molecule is initially excited by the first exposure to a high singlet (S_1) state, which then crosses to a lower triplet T_1 state, which meets the limitation of claim 7. (See, col. 3, 18-54). This disclosure also meets the limitation of claims 1, 17, 20 and 28-29, where a first exposure at a first wavelength is performed. McGinniss ('377) explains that if no further energy is applied the donor molecule in the excited triplet state would again revert to its S_0 state. (See, col.3, 61-66). McGinniss ('377) also discloses that neither the donor molecule in its primary excited state nor the acceptor molecule is sensitive to the first wavelength; therefore, single beam photo polymerization is suppressed. (See, col.3, 66-col.4, 2).

McGinniss ('377) discloses that next a second wavelength of energy is applied to the photopolymerizable vehicle, and the donor molecule in its primary excited state responds to this second energy, and is excited to a higher triplet excited state, as recited in claim 8. (See, col.4, 4-9). This disclosure also meets the limitation of claims 1, 17, 20 and 28-29 where a second exposure at a second wavelength is performed. McGinniss ('377), explains that now the donor molecules in this excited triplet state transfers energy to the acceptor, which is excited enough to release a free-radical

intermediate that initiates polymerization of the photopolymerizable vehicle. (See, col.4, 19-37). This disclosure meets the limitation of claims 11-12 and 22-23.

McGinniss ('377) discloses that suitable acceptor molecules bear chromophore functionality as well as free radical-generating functionality. (See, col.4, 53-61). For example, in table 1, McGinniss ('377) discloses the wavelength of energy applied to the photopolymerizable vehicle comprised of benzil is 400nm for the first exposure, and 486nm for the second exposure, which falls within the ranges recited in claims 5-6. (See, col.5, 5-19). This disclosure also meets the limitations of claims 1, 17, 20, 28-29, where the wavelengths for the first and second exposure are different, and the limitation of claims 3, 25 and 31, where the photoinitiator material comprises benzil.

McGinniss ('377) also discloses an example where application of a third wavelength of energy occurs to generate an excited state acceptor molecule, which meets the limitations of claims 16. (See, col.5, 40-col.6, 13). McGinniss ('377) also discloses that the exposures of the photopolymerizable vehicles are performed using filters. (See, col.7, 28-63). Still McGinniss fails to disclose the limitation of claims 1, 16-17, 20 and 28, where the photopolymerizable layer is pattern wise exposed with a first and second pattern, the limitation of claim 9, where the pattern wise exposure is done with masks that are different from each other, and the limitation of claim 16 where a third pattern wise exposure is performed. However, Bae ('114) discloses such process steps.

Bae ('114) discloses a method of forming a pattern in a semiconductor device using a multi exposure process using a plurality of photomasks to make a micro pattern that forms a highly integrated semiconductor device. (See, col.1, 6-11). Bae ('114) discloses that a first photomask is provided along with a wafer on which a resist layer is coated and then a first exposure process is performed using the first photomask, as recited in claims 1-2, 17, 19-20, 28 and 30. (See, col.1, 38-56). Then Bae ('144) discloses that a second photomask with patterns arranged as the reverse of the

first photomask is provided and a second exposure process is performed. (See, col.1, 58-col.2, 5). This disclosure meets the limitation of claims 1, 17, 20 and 28 where a second exposure with a photomask is performed, and the limitation of claim 9 where the first and second photomask are different.

Bae ('144) further discloses that a third photomask with a pattern that differs from the second photomask is provided and a third exposure process is performed, which meets the limitation of claim 16, where a third pattern wise exposure is performed. (See, col.2, 6-19). Bae ('144) disclose that still a fourth mask is provided, an exposure process with the mask is performed, and following the fourth exposure step a developing process is performed to form the pattern in the photoresist layer which can be used to form the semiconductor device. (See, col.2, 20-36). This disclosure meets the limitation of claims 13-14, 24, 27 and 33.

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to modify the teachings of McGinniss ('377) with the teachings of Bae ('144) because Bae ('144) discloses that one can perform multiple exposures on a photoresist layer with different masks to form a micro pattern that can be used to form a highly integrated semiconductor device.

4. Claims 4, 10, 21, 26 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over McGinniss ('377) in view of Bae ('144) as applied to claims 1-3, 5-9, 11-14,16-17, 19-20, 22-25, 27-31 and 33 under 35 USC 103(a) in paragraph 3 above, and further in view of Feely ('465). Still, McGinniss ('377) in view of Bae ('144) fails to disclose a process step where the photo initiator is phenothiazine and where the chemical reaction to form a pattern comprises acid generation. However, Feely ('465) discloses such process steps.

Feely ('465) discloses a method for using photoactive compounds in acid hardening photoresist to produce thermally stable high resolution images with near UV radiation. (See,

abstract). The photoactive compounds include phenothiazine, as recited in claims 4, 26 and 32 as well as derivatives of phenothiazine and phenoxazine. (See, abstract). Feely ('465) discloses that the photoactive compounds or photo sensitizers have the ability to activate or sensitize the photo acid generator, which is the compound that generates an acid for the catalysis of the acid hardening resin system upon exposure to actinic radiation. (See, col.5, 7-21). Feely ('465) goes on to disclose that the photoactive compound, upon absorption of near UV radiation is excited to a electronic state from which it can participate in different processes to transfer the absorbed energy to the photo acid generator and cause it to produce acid, such as by transfer of photoelectron, dissociation into one or more free radicals or ions that can enter into reactions. (See, col.5, 21-40). This disclosure meets the limitation of 10 and 21.

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to modify the combination of McGinniss ('377) and Bae ('144) in view of Feely ('465) because Feely ('465) discloses that one can use a phenothiazine as a photoinitiator in a resist composition, where the absorption of UV radiation initiates a reaction that generates an acid in a resin layer to form a highly stable resist image.

5. Claims 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over McGinniss ('377) in view of Bae ('144) as applied to claims 1-3, 5-9, 11-14,16-17, 19-20, 22-25, 27-31 and 33 under 35 USC 103(a) in paragraph 3 above, and further in view of Boto et al. McGinniss ('377) in view of Bae ('144) fails to discloses the limitation of claims 15 and 18 where the pattern formed comprises a feature smaller than the minimum resolution typically obtained, as calculated by $\lambda/2NA$ using the shortest of the two exposure wavelengths(λ). However, Boto et al. disclose such process steps.

Boto et al. disclose a method of non-classical entangled two-photon lithography. Boto et al. disclose that by using this method it is possible to write features of a minimum size in a photon absorbing substrate, and that more elements can be written on a semiconductor chip. Boto et al. further disclose that classical two-photon has narrower features than a one-photon process and that entangled two-photon process has even narrower features. (See, pg.2733; Fig.1). Boto et al. also explain that it is well known in the art that entangled photon pairs have unusual resolving characteristics. (See, pg. 2734).

It would have been obvious to one ordinary skill in the art to modify the combination of McGinniss ('377) and Bae ('144) in view of the teachings of Boto et al. because Boto et al. teach that one can improve the resolution of a pattern and increase the number of elements that can be written on a semiconductor chip by implementing entangled two-photon lithography.

6. Claims 1-2, 5-6, 13, 17, 19-20, 23-24 and 28-30 rejected under 35 U.S.C. 103(a) as being unpatentable over Sturtevant ('872) in view of Wang.

Sturtevant ('872) discloses a dual-wavelength exposure process. Sturtevant first discloses that a layer of photoresist is deposited over a semiconductor substrate, which meets the limitations of claims 1-2, 17, 19, 28 and 30 as well as the limitations of claims 2, 19 and 30. (See, col.3, 50-52). Then Sturtevant ('872) discloses that a first exposure, which is complete and unobstructed is performed to expose the photoresist layer to a first wavelength; however, Sturtevant ('872) discloses that in one embodiment only certain fields of the resist layer are exposed to deep UV light, including wavelengths such as 248nm, 193nm and 157nm, which fall within the range recited in claim 5. (See, col.4, 10-15). This disclosure meets the limitations of claims 1, 17, 20 and 28-29, where first pattern wise exposure at a first wavelength is performed.

Sturtevant ('872) goes on to disclose that a second exposure step is performed immediately after the first exposure step by aligning a photomask over the substrate exposing portions of the resist layer to light with a different wavelength of light different from the light used in the first exposure. (See, col.4, 48-57; col.5, 14-22). This disclosure meets the limitation of claims 1, 17, 20 and 28-29, where a second pattern wise exposure at a second wavelength is performed. The wavelength of light for the second exposure is the wavelength designated for the type of photoresist deposited on the semiconductor substrate, such as 365nm for I-line photoresist, which falls within the range recited in claim 6.

Next Sturtevant ('872) discloses that the photoresist is developed using a wet development process to remove the portions of the photoresist layer that are soluble in the developer compound. (See, col.5, 8-12). This disclosure meets the limitations of claims 13 and 24.

Still, Sturtevant ('872) fails to disclose that when the resist layer is irradiated with the first wavelength of light the irradiated portion is excited to a first excited electronic state and when the resist layer is irradiated with the second wavelength of light the irradiated portion is excited to a second excited electronic state. Moreover, Sturtevant ('872) fails to disclose that the chemical reaction the photoinitiator undergoes is free-radical generation to form a pattern. However, Wang discloses such process steps.

Wang discloses a process of micro fabrication by two-photon initiated polymerization using a low-cost micro laser. Wang discloses that when a chromophore acting as a photoinitiator is excited by simultaneous absorption of two photons it chemically activates polymerization reactions leading to the formation of solid structures. (See, pg.1348). This disclosure meets the limitation of claims 1, 20 and 28 where the irradiation excites the photoinitiator into a first and then a second excited state where the material can undergo a chemical reaction to form a pattern and claims 12 and 23 where

the reaction is polymerization. Wang also discloses that the chromophores are based on a D-Pi-D structure where D is an amino donor and Pi is a weak conjugated bridge, biphenyl or fluorene. (See, pg.1348). Wang further discloses that under laser irradiation the photo-initiator dye is excited by simultaneous absorption of the two photons, and undergoes an energy transfer reaction that results in the creation of radicals, as recited in claims 11 and 22, that can initiate the chain polymerization reaction.

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to modify the teachings of Sturtevant ('872) with the teachings of Wang because Wang discloses that simultaneous absorption by a photoinitiator of two photons induces excitation, free radical formation, which chemically activates polymerization reactions that can form a solid structure.

7. Claims 7-8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sturtevant ('872) in view of Wang as applied to claims 1-2, 5-6, 13, 17, 19-20, 23-24 and 28-30 under 35 USC 103(a) in paragraph 6 above, and further in view of McGinniss ('377). Sturtevant ('872) in view of Wang fails to disclose the limitation of claim 7 where the first excited state comprises a singlet state and the limitation of claim 8 where the second excited state is a triplet state. Moreover Sturtevant ('872) in view of Wang fails to disclose the limitation of claim 16 where the photoinitiator is irradiated with a third wavelength of light. However, McGinniss ('377) discloses such process steps.

McGinniss ('377) discloses a photopolymerizable vehicle and method for selective photo polymerization of the vehicle by application of a plurality of different selected wavelengths of energy where the single wavelength is inadequate for effecting photo polymerization. (See, abstract) The method disclosed in McGinniss ('377) consists of sequentially applying a plurality of different selected wavelengths of energy to the vehicle where photo polymerization is effected at the

intersection of said wavelengths of energy. (See, abstract). The photopolymerizable vehicle is comprised of a monomer or oligomer, a photosensitive donor, and a photo initiating acceptor. (See, abstract). The wavelengths are preferably generated by lasers. (See, abstract).

McGinniss ('377) discloses that the donor molecule is initially excited by the first exposure to a high singlet (S_1) state, which then crosses to a lower triplet T_1 state, which meets the limitation of claim 7. (See, col. 3, 18-54). McGinniss ('377) explains that if no further energy is applied the donor molecule in the excited triplet state would again revert to its S_0 state. (See, col.3, 61-66). McGinniss ('377) also discloses that neither the donor molecule in its primary excited state nor the acceptor molecule are sensitive to the first wavelength, therefore single beam photo polymerization is suppressed. (See, col.3, 66-col.4, 2).

McGinniss ('377) discloses that next a second wavelength of energy is applied to the photopolymerizable vehicle, and the donor molecules in their primary excited state respond to this second energy, which is excited to a higher triplet excited state. (See, col.4, 4-9). This disclosure meets the limitation of claim 8. McGinniss ('377), explains that now the donor molecule in this excited triplet state transfers energy to the acceptor, which is excited enough to release a free-radical intermediate that initiates polymerization of the photopolymerizable vehicle. (See, col.4, 19-37).

McGinniss ('377) also discloses an example where application of a third wavelength of energy occurs to generate an excited state acceptor molecule, which meets the limitation of claim 16, where irradiate with third wavelength, which excites the photoinitiator to a third electronic excited state. (See, col.5, 40-col.6, 13).

It would have been obvious to one of ordinary skill in the art to modify the combination of Sturtevant ('872) and Wang in view of the teachings of McGinniss ('377) because McGinniss ('377) teaches that one can excite a photoinitiator material with multiple exposures to a first and then a

second excited state, which are a singlet and then triplet state in order to activate the photoinitiator material, which initiates the polymerization reaction of a photopolymerizable vehicle or medium disposed on a substrate, and McGinniss ('377) teaches that one can perform a third exposure with a third wavelength of light to activate the photoinitiator material, which initiates photo polymerization of the photopolymerizable vehicle.

8. Claims 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sturtevant ('872) in view of Wang as applied to claims 1-2, 5-6, 13, 17, 19-20, 23-24 and 28-30 under 35 USC 103(a) in paragraph 6 above, and further in view of Boto et al. Sturtevant ('872) in view of Wang fails to discloses the limitation of claims 15 and 18 where the pattern formed comprises a feature smaller than the minimum resolution typically obtained, as calculated by $\lambda/2NA$ using the shortest of the two exposure wavelengths(λ). However, Boto et al. disclose such process steps.

Boto et al. disclose a method of non-classical entangled two-photon lithography. Boto et al. disclose that by using this method it is possible to write features of a minimum size in a photon absorbing substrate, and that more elements can be written on a semiconductor chip. Boto et al. further disclose that classical two-photon has narrower features than a one-photon process and that entangled two-photon process has even narrower features. (See, pg.2733; Fig.1). Boto et al. also explain that it is well known in the art that entangled photon pairs have unusual resolving characteristics. (See, pg. 2734).

It would have been obvious to one ordinary skill in the art to modify the combination of McGinniss ('377) and Bae ('144) in view of the teachings of Boto et al. because Boto et al. teach that one can improve the resolution of a pattern and increase the number of elements that can be written on a semiconductor chip by implementing entangled two-photon lithography.

9. Claims 4, 10, 21, 26 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sturtevant ('872) in view of Wang as applied to claims 1-2, 5-6, 13, 17, 19-20, 23-24 and 28-30 under 35 USC 103(a) in paragraph 6 above, and further in view of Feely ('465). Still, Sturtevant ('872) in view of Wang fails to disclose a process step where the photo initiator is phenothiazine and where the chemical reaction to form a pattern comprises acid generation. However, Feely ('465) discloses such process steps.

Feely ('465) discloses a method for using photoactive compounds in acid hardening photoresist to produce thermally stable high resolution images with near UV radiation. (See, abstract). The photoactive compounds include phenothiazine, as recited in claims 4, 26 and 32 as well as derivatives of phenothiazine and phenoxazine. (See, abstract). Feely ('465) discloses that the photoactive compounds or photo sensitizers have the ability to activate or sensitize the photo acid generator, which is the compound that generates an acid for the catalysis of the acid hardening resin system upon exposure to actinic radiation. (See, col.5, 7-21). Feely ('465) goes on to disclose that the photoactive compound, upon absorption of near UV radiation is excited to a electronic state from which it can participate in different process to transfer the absorbed energy to the photo acid generator and cause it to produce acid, such as by transfer of photoelectron, dissociation into ton or more free radical that can enter into reactions. (See, col.5, 21-40). This disclosure meets the limitation of 10 and 21.

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to modify the combination of Sturtevant ('872) and Wang in view of Feely ('465) because Feely ('465) discloses that one can use a phenothiazine as a photoinitiator in a resist composition, where the absorption of UV radiation initiates a reaction that generates an acid in a resin layer to form a highly stable resist image.

10. Claims 3, 25, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sturtevant ('872) in view of Wang as applied to claims 1-2, 5-6, 13, 17, 19-20, 23-24 and 28-30 under 35 USC 103(a) in paragraph 6 above, and further in view of Toshiaki. Sturtevant ('872) in view of Wang fails to disclose a process step where the photoinitiator material comprises benzil. However, Toshiaki discloses such a process step.

Toshiaki discloses a photosensitive resin composition for forming a relief plate. The photosensitive resin includes a photo polymerization initiator such as benzophenone or benzil, as recited in claims 3, 25 and 31, in the composition. (See, abstract).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to modify the combination of Sturtevant ('872) and Wang in view of the teachings of Toshiaki because Toshiaki discloses that a photosensitive resin used to form a relief plate, can include a photo polymerization initiator such as benzophenone or benzil in the photosensitive resin composition.

11. Claims 9, 14, 27 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sturtevant ('872) in view of Wang as applied to claims 1-2, 5-6, 13, 17, 19-20, 23-24 and 28-30 under 35 USC 103(a) in paragraph 6 above, and further in view of Kling ('232). Still, Sturtevant ('872) in view of Wang fails to disclose a process step where the imaging of the first wavelength is with a first photomask and the step of irradiating with the second wavelength comprises imaging with a photomask different form the first mask. However, Kling ('232) discloses such process steps.

Kling ('232) discloses a double exposure process used in semiconductor fabrication. (See, abstract). Kling ('232) discloses that a first photomask with a first pattern is positioned over a resist layer on a semiconductor substrate, which is then exposed through this first mask. Kling ('232) discloses that a second mask that includes a second pattern is positioned over the resist layer on the

semiconductor substrate, which is exposed a second time through the second photomask. (See, abstract; Fig.4). The disclosures meet the limitations of claim 9. Kling ('232) further discloses that a baking step, a developing step and then an etching or implanting step follows the dual exposure steps. (See, Fig.4). This disclosure meets the limitation of claims 14, 27 and 33.

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to modify the combination of Sturtevant ('872) and Wang in view of the teachings of Kling ('232) because Kling ('232) teaches that one can use multiple photomasks with different patterns to form a resist pattern on a semiconductor substrate that can later be used in an etching step to form a pattern in the semiconductor substrate in a semiconductor fabrication process.

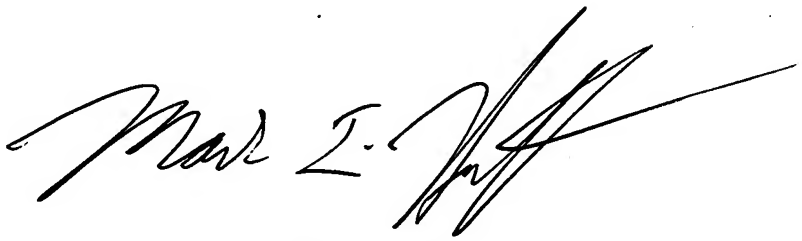
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caleen O. Sullivan whose telephone number is 571-272-6569. The examiner can normally be reached Monday-Friday, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/COS/, 05/22/2007



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